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(54) PRODUCTION OF SKIMMED MILK BEVERAGE

(57)Abstract:
PURPOSE: To obtain the beverage having good preservability of lactoprotein even after subjected to UHT sterilization, by mixing skimmed milk with a sucrose fatty acid ester under specified conditions followed by making the mixture into a solution.
CONSTITUTION: (A) Skimmed milk 1-30wt.% in solid concentration and (B) a sucrose fatty acid ester 3-16 in HLB number at the weight ratio A/B of ≥1/360 on a solid basis are made into a solution of pH5.0-8.0. This solution is then subjected to UHT sterilization at ≥110° C to obtain the beverage with long-term preservability.

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CLAIMS

[Claim(s)]
[Claim 1] The manufacture approach of the sterilization skimmilk drink characterized by performing UHT sterilization processing for the solution of pH 5.0-8.0 containing the skimmilk of 1 - 30 % of the weight of solid-not-fat concentration, and the sucrose fatty acid ester of the solid-not-fat weight ratio 1 / 360 or more HLB ** 3-16 at 110 degrees C or more of sterilization temperature.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] Even if this invention performs super-pasteurization processing in the skimmilk which hardly contains a part for milk fat, it relates to the manufacture approach of a sterilization skimmilk drink that mothball stability can be held.
[0002]
[Description of the Prior Art] The milk protein to contain causes thermal denaturation, and becomes easy to precipitate, and the drink object containing milk protein has the fault that preservation stability falls, when ultrahigh-temperature-heating sterilization processing of UHT sterilization etc. is usually performed. Then, when it is the milk protein content drink which needs to perform such UHT sterilization conventionally, the approach of suppressing the processing time of this UHT sterilization to the minimum, and adding polysaccharide, such as pectin, a carrageenan, Cyamoposis Gum, locust bean gum, or tragacanth gum, is performed.
[0003] However, since the most contains a part for milk fat, the drink object containing the milk protein with which such processing is perform fills up a paper pack or a bottle and it is sell, even if the preservation stability demand in consumption cycle is about one week, said UHT sterilization processing time is short and sterilization is inadequate, the actual condition is that the fault accompanying it is not make an issue of so much.
[0004] On the other hand, although the milk protein content drink with which the can product was filled up recently is proposed and sold, since it is an one-year about room in the case where between the preservation stationary phases which are demanded as compared with the milk protein drink containing the part for conventional milk fat in the case of such a can product is long, it is necessary to also fully perform UHT sterilization. Then, although the preservation stability of milk protein is secured by mechanical homogeneity processing and sufficient UHT sterilization is given when manufacturing such a milk protein content drink, there is a fault that need to be furnished special for performing mechanical homogeneity processing, and moreover a production process makes it complicated.
[0005] On the other hand, in order to make good milk protein preservation stability of a with a pH of 4.2 or less milk protein content acidity drink from the former, making 13 or more HLB sucrose fatty acid ester contain is proposed (JP,59-41709,B). However, if super-pasteurization like UHT sterilization is performed in the case of such an acid drink, even if it makes 13 or more HLB sucrose fatty acid ester contain even if, the denaturation condensation by hydrolysis and the heat of milk protein will arise. Namely, in the case of such an acid drink, super-pasteurization like UHT sterilization cannot be made into a prerequisite requirement. And in order that an addition operation of 13 or more HLB sucrose fatty acid ester may improve the preservation stability of the milk protein by heat denaturation, it is not acting. It is acting in order to prevent the precipitation at the time of souring processing of milk protein, and the mechanism of action completely differs from the case where the preservation stability of the milk protein content drink which makes super-pasteurization like UHT sterilization a prerequisite requirement is held.
[0006]
[Problem(s) to be Solved by the Invention] Even if the purpose of this invention performs

sufficient UHT sterilization processing, it is to offer the manufacture approach of the sterilization skimmilk drink which can be manufactured industrially and easily, without being able to secure the preservation stability of very good milk protein, and moreover using a special facility etc.
[0007]
[Means for Solving the Problem] According to this invention, the manufacture approach of the sterilization skimmilk drink characterized by performing UHT sterilization processing for the solution (Solution A being called below) of pH 5.0-8.0 containing the skimmilk of 1 - 30 % of the weight of solid-not-fat concentration and the sucrose fatty acid ester of the solid-not-fat weight ratio 1 / 360 or more HLB ** 3-16 at 110 degrees C or more of sterilization temperature is offered.
[0008] This invention is further explained to a detail below.
[0009] By the manufacture approach of this invention, UHT sterilization of the solution A of the specification pH containing the skimmilk of the amount of specification and the sucrose fatty acid ester of HLB ** 3-16 of the amount of specification is carried out.
[0010] Although wide range milk can be used regardless of the thing of an animal and the vegetable origin as a skimmilk used for this invention, vegetable milk [, such as beast milk; soybean milk,], such as cow's milk, goat's milk, ewe milk, and horse milk, etc. can be mentioned, for example, and it can use as independent or mixture on the occasion of use. One to 30% of the weight, preferably, the solid-not-fat concentration in a skimmilk content solution adds the content rate of this skimmilk so that it may become 2 - 25 % of the weight. The preservation stability effectiveness of the specific sucrose fatty acid ester at the time of the UHT sterilization later mentioned when solid-not-fat concentration is less than 1 % of the weight is not enough, and when exceeding 30 % of the weight, manufacture of a skimmilk drink is difficult.
[0011] The sucrose fatty acid ester contained in said solution A can mention the monochrome of cane sugar and fatty acids, such as a palmitic acid, stearin acid, and oleic acid, JI, triester, or such mixture, and HLB ** needs to be set to 9-16 from 3-16, and the soluble point of preferably as opposed to the water of sucrose fatty acid ester. The preservation stability of a request of HLB ** of milk protein when [said] out of range is not acquired. It is necessary to set preferably the content rate of this sucrose fatty acid ester to 1 / 360 - 1/60 1/360 or more by said solid-not-fat weight ratio. Under the present circumstances, the addition effectiveness of sucrose fatty acid ester is not acquired at the case of 1/less than 360.
[0012] pH of the solution A containing said skimmilk and sucrose fatty acid ester -- 5.0-8.0 -- it is necessary to adjust to 5.5-7.5 preferably Under the present circumstances, in condensation etc. arising in hydrolysis of milk protein, and a thermal denaturation list in the case of the UHT sterilization mentioned later when pH is less than 5.0, and exceeding pH8.0, the coagulation sedimentation and deamination of the calcium in milk become easy to take place.
[0013] In order to prepare the solution A containing said skimmilk and sucrose fatty acid ester, it can obtain by the approach of mixing a skimmilk and a sucrose-fatty-acid-ester solution, the approach of carrying out the homogeneity dissolution of skimmilk powder and the sucrose fatty acid ester after powder mixing beforehand, etc. In order to prepare said skimmilk, skimmilk powder can be added to the ion exchange water of an initial complement, and, in mass preparation, it can obtain further by the approach of carrying out the churning mixing homogeneity dissolution using a stirrer, the approach of carrying out the homogeneity dissolution using a puff blender etc., etc. On the other hand, in order to prepare said sucrose-fatty-acid-ester solution, in the case of the sucrose fatty acid ester of HLB ** 9-16, it can obtain by the approach of carrying out the churning dissolution in room temperature extent so that it may become a water solution two to 20% of the weight, and heating at 60-80 degrees C, and carrying out the churning dissolution so that it may become with a water solution two to 20% of the weight in the case of less than nine HLB ** sucrose fatty acid ester etc.
[0014] Next, in the approach of this invention, 110-150 degrees C of UHT sterilization are preferably performed especially for said solution A in 110-130 degrees C 110 degrees C or more of sterilization temperature. When sterilization temperature is less than 110 degrees C, sufficient bactericidal effect is not acquired to a heat-resistant microorganism. Moreover, as for especially the processing time, i.e., the residence time in the sterilization temperature of said solution A, it

is desirable for 1 to 60 seconds that it is 5 - 60 seconds. Since there is a possibility that economical efficiency and too much denaturation of milk protein may arise in not acquiring bactericidal effect sufficient when the residence time is less than 1 second and exceeding 60 seconds, it is not desirable. Moreover, it is desirable to divide the temperature up of temperature into two or more steps, such as two etc. steps, and to perform it in respect of effectiveness, and after carrying out the temperature up of the processing in said UHT sterilization to the 1st step to less than 90-110 degrees C, specifically, it is desirable [the processing] to carry out a temperature up to 110 - request temperature in the 2nd step. Furthermore, said UHT sterilization can be performed by the well-known approach, and surface heat exchangers, such as the shape of the shape for example, of an indirect plate, the shape of a coil type tube, and scrape, etc. can be used for it as a sterilizer.

[0015] To the sterilization skimmilk drink obtained by the approach of this invention, an additive usable to usual drinks, such as cane sugar, fruit sugar, grape sugar, other various fruit juice, fats and oils, perfume, and coloring matter, as sweetners besides said indispensable component can be added. The addition stage of this additive can be suitably chosen according to the class of the component. Moreover, after adding a lactic acid, fruit-sugar grape sugar, perfume, etc. to the obtained sterilization skimmilk drink and making pH about into 3.3 to 3.6, at 80-90 degrees C, it can process for 1 - 10 minutes, and can also consider as soft drinks.

[0016] For example, a paper pack, a can, a bottle, etc. can be filled up with the sterilization skimmilk drink obtained by the approach of this invention, and it can secure the preservation stability of milk protein, and disinfectant preferably especially at a room temperature more than in December more than in June.

[0017]

[Effect of the Invention] By the manufacture approach of this invention, since the specific solution A which hardly contains a part for milk fat is processed by UHT sterilization, without easy moreover needing a special facility etc., it excels in the mothball stability of milk protein, and the skimmilk drink moreover sterilized can be obtained. Therefore, it is very useful to industrial manufacture of the skimmilk drink on condition of a mothball.

[0018]

[Example] Although an example and the example of a comparison explain to a detail further below, this invention is not limited to these.

[0019]

[Example 1] 4000g of water was added to 1000g of skimmilk powder, and the skimmilk of pH6.5 and 20 % of the weight of solid-not-fat concentration was prepared. Subsequently, 16.55g (a trade name "P-1670", product made from ****, Inc.) of sucrose fatty acid ester of HLB ** 16 was added, and the 0.33 % of the weight content solution of sucrose fatty acid ester was prepared. About the obtained solution, in each (110 degrees C of sterilization temperature, 120 degrees C, and 130 degrees C), UHT sterilization was performed by a unit of 30 second, and the skimmilk drink was manufactured with the RMS type small capacity liquid continuation sterilization testing machine (Hisaka Works make).

[0020] Next, the particle diameter of the milk protein contained about each obtained skimmilk drink using laser analysis type particle-size-distribution equipment (form "SALD-1100", Shimadzu make) was measured, and the bactericidal effect was measured about the number of survival of heat-resistant mold using the potato dextrose agar medium according to the food-sanitation-hygine inspection guide (Japan Food Hygiene Association issue). A result is shown in Table 1. In addition, precipitation does not arise, so that particle diameter is small, but excelling in preservation stability is shown.

[0021]

[The example 1 of a comparison] Except not adding sucrose fatty acid ester or not performing UHT sterilization, the skimmilk drink was prepared like the example 1 and each measurement was performed. A result is shown in Table 1.

[0022]

[The example 2 of a comparison] Except not adding sucrose fatty acid ester, the skimmilk drink was prepared like the example 1 and mechanical homogenization was performed further. The

laboratory homogenizer (form 15M-8BA, product made from MANTON-GAURIN) was used for the mechanical homogenization art. The result of the same sterilization measurement as the mean particle diameter (micrometer) of milk protein and an example 1 is shown in Table 2.

[0023]

[Table 1]

	ショ糖脂肪酸エステル添加量	UHT殺菌条件	平均粒径（μm）	UHT殺菌効果 *
実施例1	0．33重量%	110℃、30秒	0．26	−
	0．33重量%	120℃、30秒	0．30	−
	0．33重量%	130℃、30秒	0．35	−
比較例1	0．33重量%	なし	0．33	++
	0	なし	0．26	++
	0	110℃、30秒	0．28	−
	0	120℃、30秒	7．89	−
	0	130℃、30秒	3．39	−

＊ ++；菌の生存が多い、−；菌の生存なし

[0024]

[Table 2]

UHT殺菌条件	均質化条件				UHT殺菌効果 *
	なし	150kg/cm³	300kg/cm³	500kg/cm³	
なし	0．27				++
120℃、30秒	0．90	0．34	0．32	0．31	−
130℃、30秒	4．50	1．86	1．29	0．65	−

＊ ++；菌の生存が多い、−；菌の生存なし

[0025]

[The example 3 of a comparison] Except the citric-acid solution having adjusted pH of the solution containing a skimmilk and sucrose fatty acid ester to 4 10%, like the example 1, when the skimmilk drink was prepared, precipitation of milk protein was checked by viewing immediately after preparation, and it turned out that it is inferior to the preservation stability of milk protein.

[0026]

[Example 2] After adding 1500g of fruit-sugar grape-sugar liquid, 50g of 20-% of the weight lactic-acid solutions, and 200g of perfume to 500g of skimmilk drinks prepared in the example 1 and agitating enough to them, 20 more% of the weight of the lactic-acid solution was added, it adjusted to pH3.45, subsequently water was added, and the soft drinks of 10000g of whole quantity were manufactured. After carrying out 80 degrees C and heat-treatment during 10 minutes, 200ml **** was filled up with soft drinks, and the preservation stability the same measurement as an example 1 and 37 degrees C, and after the February progress was measured. A result is shown in Table 3.

[0027]

[The example 4 of a comparison] After adding 1.65g (the trade name "P-1670", product made from ****, Inc.) of sucrose fatty acid ester, 1500g of fruit-sugar grape-sugar liquid, 50g of 20-% of the weight lactic-acid solutions, and 200g of perfume of HLB ** 16 to 500g of skimmilk drinks prepared in the example 1 of a comparison and agitating enough to them, 20 more% of the weight of the lactic-acid solution was added, it adjusted to pH3.45, subsequently water was added, and the soft drinks of 10000g of whole quantity were manufactured. After carrying out 80 degrees C and heat-treatment during 10 minutes, 200ml **** was filled up with soft drinks, and the

preservation stability the same measurement as an example 1 and 37 degrees C, and after the February progress was measured. A result is shown in Table 3.

[0028]

[Table 3]

	ショ糖脂肪酸エステル添加量	ＵＨＴ殺菌条件	平均粒径（μｍ）	保存安定性＊
実施例2	０．３３重量％	１１０℃、３０秒	０．４６	－～±
	０．３３重量％	１２０℃、３０秒	０．３９	－～±
	０．３３重量％	１３０℃、３０秒	０．５７	±
比較例4	０．３３重量％	なし	０．３８	－～±
	０	なし	０．３８	－～±
	０	１１０℃、３０秒	０．４１	±
	０	１２０℃、３０秒	６．４３	＋
	０	１３０℃、３０秒	２．７７	＋

＊－；３７℃、２か月後沈澱なし、±；３７℃、２か月後沈澱少
＋；３７℃、２か月後沈澱多

[0029]

[Example 3] 1000g of skimmilk powder was dissolved in 4000g of water, except having added the sucrose fatty acid ester of HLB ** 3-16 shown in Table 3, respectively so that it might become 0.222 % of the weight, the skimmilk drink was prepared like the example 1 and each measurement was performed. The result is shown in Table 4.

[0030]

[Table 4]

ショ糖脂肪酸エステルＨＬＢ	ＵＨＴ殺菌条件	平均粒径（μｍ）
無添加	１１０℃、３０秒	０．２８
	１２０℃、３０秒	４．６２
	１３０℃、３０秒	５．８２
3	１１０℃、３０秒	０．２８
	１２０℃、３０秒	０．３５
	１３０℃、３０秒	０．３６
5	１１０℃、３０秒	０．２７
	１２０℃、３０秒	０．３０
	１３０℃、３０秒	０．３８
7	１１０℃、３０秒	０．２８
	１２０℃、３０秒	０．２９
	１３０℃、３０秒	０．３１
9	１１０℃、３０秒	０．３１
	１２０℃、３０秒	０．３２
	１３０℃、３０秒	０．３４
１１	１１０℃、３０秒	０．２９
	１２０℃、３０秒	０．３５
	１３０℃、３０秒	０．４４
１５	１１０℃、３０秒	０．２８
	１２０℃、３０秒	０．３２
	１３０℃、３０秒	０．３２
１６	１１０℃、３０秒	０．２７
	１２０℃、３０秒	０．２９
	１３０℃、３０秒	０．３５

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TECHNICAL FIELD

[Industrial Application] Even if this invention performs super-pasteurization processing in the skimmilk which hardly contains a part for milk fat, it relates to the manufacture approach of a sterilization skimmilk drink that mothball stability can be held.

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PRIOR ART

[Description of the Prior Art] The milk protein to contain causes thermal denaturation, and becomes easy to precipitate, and the drink object containing milk protein has the fault that preservation stability falls, when ultrahigh-temperature-heating sterilization processing of UHT sterilization etc. is usually performed. Then, when it is the milk protein content drink which needs to perform such UHT sterilization conventionally, the approach of suppressing the processing time of this UHT sterilization to the minimum, and adding polysaccharide, such as pectin, a carrageenan, Cyamoposis Gum, locust bean gum, or tragacanth gum, is performed.
[0003] However, since the most contains a part for milk fat, the drink object containing the milk protein with which such processing is perform fills up a paper pack or a bottle and it is sell, even if the preservation stability demand in consumption cycle is about one week, said UHT sterilization processing time is short and sterilization is inadequate, the actual condition is that the fault accompanying it is not make an issue of so much.
[0004] On the other hand, although the milk protein content drink with which the can product was filled up recently is proposed and sold, since it is an one-year about room in the case where between the preservation stationary phases which are demanded as compared with the milk protein drink containing the part for conventional milk fat in the case of such a can product is long, it is necessary to also fully perform UHT sterilization. Then, although the preservation stability of milk protein is secured by mechanical homogeneity processing and sufficient UHT sterilization is given when manufacturing such a milk protein content drink, there is a fault that need to be furnished special for performing mechanical homogeneity processing, and moreover a production process makes it complicated.
[0005] On the other hand, in order to make good milk protein preservation stability of a with a pH of 4.2 or less milk protein content acidity drink from the former, making 13 or more HLB sucrose fatty acid ester contain is proposed (JP,59-41709,B). However, if super-pasteurization like UHT sterilization is performed in the case of such an acid drink, even if it makes 13 or more HLB sucrose fatty acid ester contain even if, the denaturation condensation by hydrolysis and the heat of milk protein will arise. Namely, in the case of such an acid drink, super-pasteurization like UHT sterilization cannot be made into a prerequisite requirement. And in order that an addition operation of 13 or more HLB sucrose fatty acid ester may improve the preservation stability of the milk protein by heat denaturation, it is not acting. It is acting in order to prevent the precipitation at the time of souring processing of milk protein, and the mechanism of action completely differs from the case where the preservation stability of the milk protein content drink which makes super-pasteurization like UHT sterilization a prerequisite requirement is held.

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EFFECT OF THE INVENTION

[Effect of the Invention] By the manufacture approach of this invention, since the specific solution A which hardly contains a part for milk fat is processed by UHT sterilization, without easy moreover needing a special facility etc., it excels in the mothball stability of milk protein, and the skimmilk drink moreover sterilized can be obtained. Therefore, it is very useful to industrial manufacture of the skimmilk drink on condition of a mothball.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Even if the purpose of this invention performs sufficient UHT sterilization processing, it is to offer the manufacture approach of the sterilization skimmilk drink which can be manufactured industrially and easily, without being able to secure the preservation stability of very good milk protein, and moreover using a special facility etc.

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MEANS

[Means for Solving the Problem] According to this invention, the manufacture approach of the sterilization skimmilk drink characterized by performing UHT sterilization processing for the solution (Solution A being called below) of pH 5.0-8.0 containing the skimmilk of 1 - 30 % of the weight of solid-not-fat concentration and the sucrose fatty acid ester of the solid-not-fat weight ratio 1 / 360 or more HLB ** 3-16 at 110 degrees C or more of sterilization temperature is offered.
[0008] This invention is further explained to a detail below.
[0009] By the manufacture approach of this invention, UHT sterilization of the solution A of the specification pH containing the skimmilk of the amount of specification and the sucrose fatty acid ester of HLB ** 3-16 of the amount of specification is carried out.
[0010] Although wide range milk can be used regardless of the thing of an animal and the vegetable origin as a skimmilk used for this invention, vegetable milk [, such as beast milk; soybean milk,], such as cow's milk, goat's milk, ewe milk, and horse milk, etc. can be mentioned, for example, and it can use as independent or mixture on the occasion of use. One to 30% of the weight, preferably, the solid-not-fat concentration in a skimmilk content solution adds the content rate of this skimmilk so that it may become 2 - 25 % of the weight. The preservation stability effectiveness of the specific sucrose fatty acid ester at the time of the UHT sterilization later mentioned when solid-not-fat concentration is less than 1 % of the weight is not enough, and when exceeding 30 % of the weight, manufacture of a skimmilk drink is difficult.
[0011] The sucrose fatty acid ester contained in said solution A can mention the monochrome of cane sugar and fatty acids, such as a palmitic acid, stearin acid, and oleic acid, JI, triester, or such mixture, and HLB ** needs to be set to 9-16 from 3-16, and the soluble point of preferably as opposed to the water of sucrose fatty acid ester. The preservation stability of a request of HLB ** of milk protein when [said] out of range is not acquired. It is necessary to set preferably the content rate of this sucrose fatty acid ester to 1 / 360 - 1/60 1/360 or more by said solid-not-fat weight ratio. Under the present circumstances, the addition effectiveness of sucrose fatty acid ester is not acquired at the case of 1/less than 360.
[0012] pH of the solution A containing said skimmilk and sucrose fatty acid ester -- 5.0-8.0 -- it is necessary to adjust to 5.5-7.5 preferably Under the present circumstances, in condensation etc. arising in hydrolysis of milk protein, and a thermal denaturation list in the case of the UHT sterilization mentioned later when pH is less than 5.0, and exceeding pH8.0, the coagulation sedimentation and deamination of the calcium in milk become easy to take place.
[0013] In order to prepare the solution A containing said skimmilk and sucrose fatty acid ester, it can obtain by the approach of mixing a skimmilk and a sucrose-fatty-acid-ester solution, the approach of carrying out the homogeneity dissolution of skimmilk powder and the sucrose fatty acid ester after powder mixing beforehand, etc. In order to prepare said skimmilk, skimmilk powder can be added to the ion exchange water of an initial complement, and, in mass preparation, it can obtain further by the approach of carrying out the churning mixing homogeneity dissolution using a stirrer, the approach of carrying out the homogeneity dissolution using a puff blender etc., etc. On the other hand, in order to prepare said sucrose-fatty-acid-ester solution, in the case of the sucrose fatty acid ester of HLB ** 9-16, it can obtain by the

approach of carrying out the churning dissolution in room temperature extent so that it may become a water solution two to 20% of the weight, and heating at 60-80 degrees C, and carrying out the churning dissolution so that it may become with a water solution two to 20% of the weight in the case of less than nine HLB ** sucrose fatty acid ester etc.

[0014] Next, in the approach of this invention, 110-150 degrees C of UHT sterilization are preferably performed especially for said solution A in 110-130 degrees C 110 degrees C or more of sterilization temperature. When sterilization temperature is less than 110 degrees C, sufficient bactericidal effect is not acquired to a heat-resistant microorganism. Moreover, as for especially the processing time, i.e., the residence time in the sterilization temperature of said solution A, it is desirable for 1 to 60 seconds that it is 5 - 60 seconds. Since there is a possibility that economical efficiency and too much denaturation of milk protein may arise in not acquiring bactericidal effect sufficient when the residence time is less than 1 second and exceeding 60 seconds, it is not desirable. Moreover, it is desirable to divide the temperature up of temperature into two or more steps, such as two etc. steps, and to perform it in respect of effectiveness, and after carrying out the temperature up of the processing in said UHT sterilization to the 1st step to less than 90-110 degrees C, specifically, it is desirable [the processing] to carry out a temperature up to 110 - request temperature in the 2nd step. Furthermore, said UHT sterilization can be performed by the well-known approach, and surface heat exchangers, such as the shape of the shape for example, of an indirect plate, the shape of a coil type tube, and scrape, etc. can be used for it as a sterilizer.

[0015] To the sterilization skimmilk drink obtained by the approach of this invention, an additive usable to usual drinks, such as cane sugar, fruit sugar, grape sugar, other various fruit juice, fats and oils, perfume, and coloring matter, as sweetners besides said indispensable component can be added. The addition stage of this additive can be suitably chosen according to the class of the component. Moreover, after adding a lactic acid, fruit-sugar grape sugar, perfume, etc. to the obtained sterilization skimmilk drink and making pH about into 3.3 to 3.6, at 80-90 degrees C, it can process for 1 - 10 minutes, and can also consider as soft drinks.

[0016] For example, a paper pack, a can, a bottle, etc. can be filled up with the sterilization skimmilk drink obtained by the approach of this invention, and it can secure the preservation stability of milk protein, and disinfectant preferably especially at a room temperature more than in December more than in June.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

EXAMPLE

[Example] Although an example and the example of a comparison explain to a detail further below, this invention is not limited to these.
[0019]
[Example 1] 4000g of water was added to 1000g of skimmilk powder, and the skimmilk of pH6.5 and 20 % of the weight of solid-not-fat concentration was prepared. Subsequently, 16.55g (a trade name "P-1670", product made from ****, Inc.) of sucrose fatty acid ester of HLB ** 16 was added, and the 0.33 % of the weight content solution of sucrose fatty acid ester was prepared. About the obtained solution, in each (110 degrees C of sterilization temperature, 120 degrees C, and 130 degrees C), UHT sterilization was performed by a unit of 30 second, and the skimmilk drink was manufactured with the RMS type small capacity liquid continuation sterilization testing machine (Hisaka Works make).
[0020] Next, the particle diameter of the milk protein contained about each obtained skimmilk drink using laser analysis type particle-size-distribution equipment (form "SALD-1100", Shimadzu make) was measured, and the bactericidal effect was measured about the number of survival of heat-resistant mold using the potato dextrose agar medium according to the food-sanitation-hygine inspection guide (Japan Food Hygiene Association issue). A result is shown in Table 1. In addition, precipitation does not arise, so that particle diameter is small, but excelling in preservation stability is shown.
[0021]
[The example 1 of a comparison] Except not adding sucrose fatty acid ester or not performing UHT sterilization, the skimmilk drink was prepared like the example 1 and each measurement was performed. A result is shown in Table 1.
[0022]
[The example 2 of a comparison] Except not adding sucrose fatty acid ester, the skimmilk drink was prepared like the example 1 and mechanical homogenization was performed further. The laboratory homogenizer (form 15M-8BA, product made from MANTON-GAURIN) was used for the mechanical homogenization art. The result of the same sterilization measurement as the mean particle diameter (micrometer) of milk protein and an example 1 is shown in Table 2.
[0023]
[Table 1]

	ショ糖脂肪酸エステル添加量	UHT殺菌条件	平均粒径（μm）	UHT殺菌効果 *
実施例1	0.33重量%	110℃、30秒	0.26	−
	0.33重量%	120℃、30秒	0.30	−
	0.33重量%	130℃、30秒	0.35	−
比較例1	0.33重量%	なし	0.33	++
	0	なし	0.26	++
	0	110℃、30秒	0.28	−
	0	120℃、30秒	7.89	−
	0	130℃、30秒	3.39	−

* ++；菌の生存が多い、−；菌の生存なし

[0024]
[Table 2]

UHT殺菌条件	均質化条件				UHT殺菌効果 *
	なし	150kg/cm³	300kg/cm³	500kg/cm³	
なし	0.27				++
120℃、30秒	0.90	0.34	0.32	0.31	−
130℃、30秒	4.50	1.86	1.29	0.65	−

* ++；菌の生存が多い、−；菌の生存なし

[0025]
[The example 3 of a comparison] Except the citric-acid solution having adjusted pH of the solution containing a skimmilk and sucrose fatty acid ester to 4 10%, like the example 1, when the skimmilk drink was prepared, precipitation of milk protein was checked by viewing immediately after preparation, and it turned out that it is inferior to the preservation stability of milk protein.
[0026]
[Example 2] After adding 1500g of fruit-sugar grape-sugar liquid, 50g of 20-% of the weight lactic-acid solutions, and 200g of perfume to 500g of skimmilk drinks prepared in the example 1 and agitating enough to them, 20 more% of the weight of the lactic-acid solution was added, it adjusted to pH3.45, subsequently water was added, and the soft drinks of 10000g of whole quantity were manufactured. After carrying out 80 degrees C and heat-treatment during 10 minutes, 200ml **** was filled up with soft drinks, and the preservation stability the same measurement as an example 1 and 37 degrees C, and after the February progress was measured. A result is shown in Table 3.
[0027]
[The example 4 of a comparison] After adding 1.65g (the trade name "P-1670", product made from ****, Inc.) of sucrose fatty acid ester, 1500g of fruit-sugar grape-sugar liquid, 50g of 20-% f the weight lactic-acid solutions, and 200g of perfume of HLB ** 16 to 500g of skimmilk drinks pared in the example 1 of a comparison and agitating enough to them, 20 more% of the weight he lactic-acid solution was added, it adjusted to pH3.45, subsequently water was added, and oft drinks of 10000g of whole quantity were manufactured. After carrying out 80 degrees C eat-treatment during 10 minutes, 200ml **** was filled up with soft drinks, and the vation stability the same measurement as an example 1 and 37 degrees C, and after the progress was measured. A result is shown in Table 3.

	ショ糖脂肪酸エステル添加量	ＵＨＴ殺菌条件	平均粒径（μｍ）	保存安定性＊
実施例2	０．３３重量％	１１０℃、３０秒	０．４６	－～±
	０．３３重量％	１２０℃、３０秒	０．３９	－～±
	０．３３重量％	１３０℃、３０秒	０．５７	±
比較例4	０．３３重量％	なし	０．３８	－～±
	０	なし	０．３８	－～±
	０	１１０℃、３０秒	０．４１	±
	０	１２０℃、３０秒	６．４３	＋
	０	１３０℃、３０秒	２．７７	＋

＊－；３７℃、２か月後沈澱なし、±；３７℃、２か月後沈澱少
＋；３７℃、２か月後沈澱多

[0029]
[Example 3] 1000g of skimmilk powder was dissolved in 4000g of water, except having added the sucrose fatty acid ester of HLB ** 3-16 shown in Table 3, respectively so that it might become 0.222 % of the weight, the skimmilk drink was prepared like the example 1 and each measurement was performed. The result is shown in Table 4.
[0030]
[Table 4]

ショ糖脂肪酸エステルＨＬＢ	ＵＨＴ殺菌条件	平均粒径（μｍ）
無添加	１１０℃、３０秒	０．２８
	１２０℃、３０秒	４．６２
	１３０℃、３０秒	５．８２
3	１１０℃、３０秒	０．２８
	１２０℃、３０秒	０．３５
	１３０℃、３０秒	０．３６
5	１１０℃、３０秒	０．２７
	１２０℃、３０秒	０．３０
	１３０℃、３０秒	０．３８
7	１１０℃、３０秒	０．２８
	１２０℃、３０秒	０．２９
	１３０℃、３０秒	０．３１
9	１１０℃、３０秒	０．３１
	１２０℃、３０秒	０．３２
	１３０℃、３０秒	０．３４
11	１１０℃、３０秒	０．２９
	１２０℃、３０秒	０．３５
	１３０℃、３０秒	０．４４
15	１１０℃、３０秒	０．２８
	１２０℃、３０秒	０．３２
	１３０℃、３０秒	０．３２
16	１１０℃、３０秒	０．２７
	１２０℃、３０秒	０．２９
	１３０℃、３０秒	０．３５

[Translation done.]